



GENERAL LOOP INSTALLATION GUIDELINES

The following loop installation guidelines are for installing typical roadway loops for traffic and access control applications (i.e. intersections, parking gates, sliding gates, etc...). Always consult with all manufacturing companies of the equipment that the roadway loop will be connected to and/or interfacing with (i.e. intersection controller companies, vehicle classification/counter companies, vehicle detection companies, etc...). This will confirm that the proper configuration and installation techniques are properly applied for your application.

Useful information about inductive loops:

- a. The typical sensing height is 2/3 of the shortest leg of a loop (in feet). Therefore a 4' x 8' loop typically has a detection height of 2.6'.
- b. The inductance of a conventional four-sided loop can be estimated using the formula:

$$L = P \times (T^2 + T) / 4$$

Where L = Loop Inductance in microHenries
 P = Loop Perimeter in feet
 T = Number of turns of wires in saw slot

Therefore a 4' x 8' loop with 3 turns would be:

$$L = (4 + 8 + 4 + 8) \times (3^2 + 3) / 4$$

$$L = 24 \times (9 + 3) / 4$$

$$L = 24 \times 12 / 4$$

$$L = 24 \times 3$$

$$L = 72 \text{ microHenries}$$

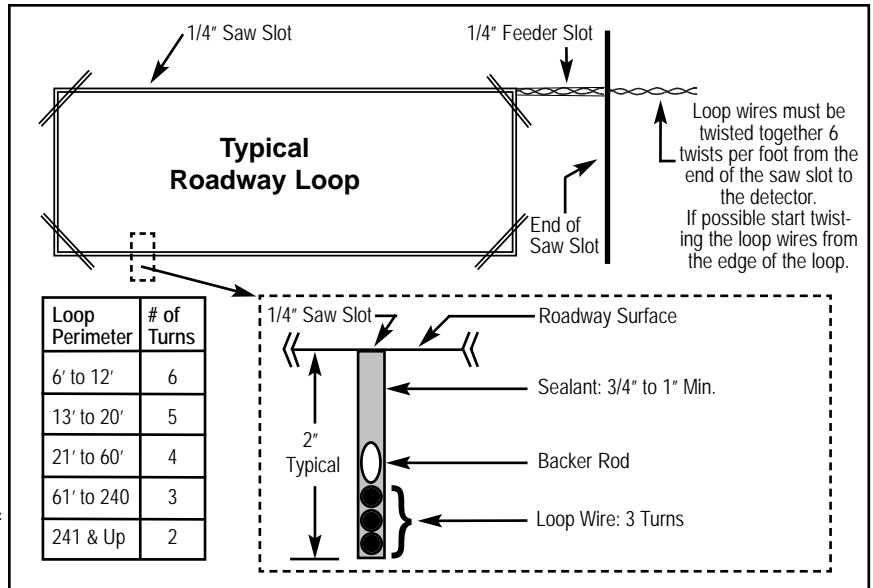
Note: Loop feeder cable typically adds 0.22 microHenries of inductance per foot of cable.

The following are suggested guidelines for loop installation:

To begin, make sure that the pavement surface in the area that loops are to be installed is dry and free of debris.

The outline of the loop(s) should be marked on the pavement in such a way that the lines can be followed easily by the saw operator and not be erased by the water feed from the saw itself.

All 90-degree corners should be chamfered so that the course of the loop wire does not change direction sharply but rather at shallower angles of 45 degrees or less. Core drilling of the corners achieves the same effect but can still lead to failure due to sharp edges remaining in the corner area.



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Loop Installation Guidelines (Cont.)

When the outline of the loop and lead-in has been marked, the pavement can be cut. Diamond blade cutting saws are recommended. The saw cut should be approximately 2.0 inches deep and 0.25 inches wide. The saw slot should then be cleaned out and allowed to dry. Compressed air is useful both for ejecting debris and speeding up the drying process. All debris in the vicinity of the saw slot should also be removed so that it is not accidentally pushed back in.

Recommended loop wire is typically 14, 16, 18, or 20 AWG with cross-linked polyethylene insulation. Since moisture can cause significant changes in the dielectric constant of the insulation, which results in excessive loop (frequency) drift, choose an insulation, which is most impervious to moisture. PVC, TFFN, THHN, and THHN-THWN should be avoided since they tend to absorb moisture and crack easily. XLPE (Cross Linked Polyethylene) is very resistant to moisture absorption and provides good abrasion resistance.

If long lead-ins are required, it is suggested that the loop cable be spliced onto shielded, pre-twisted, lead-in wire (IMSA specification 50-2 is suggested) at a convenient pull box location close to the loop. The shield may be connected to earth at the cabinet end but should then be insulated and isolated from earth ground at the loop end.

Start laying the loop wire from the termination of the lead-in out towards the loop, continue around the loop for the number of turns required and finally return to the lead-in termination. Leave the lead-in wire out of the slot so that it may be twisted together before being laid in the slot. Lead-ins should be twisted with a minimum of 4 to 6 twists per foot to prevent any separation of the lead-in wires.

Make sure that the loop wire is pushed fully to the bottom of the saw slot. Small pieces of foam rubber (backer rod) or similar material may be used at various points around the circumference to prevent the loop wire from rising up while the sealant is poured and curing.

Many different types of loop sealant are now available. Single part types are the easiest to apply since no mixing is required, but they also tend to be more expensive in terms of linear feet of saw slot filled. When applying the sealant, make sure that it is able to sink to the bottom of the slot and completely encase the loop wire. The wire should not be able to move when the sealant has set. Ensure that there is enough sealant to completely fill the slot; if possible the sealant should protrude slightly above the surface of the pavement so that small rocks or other debris cannot collect in the slot.

The sealant manufacturer's instructions concerning setting time should be noted - especially when determining the length of time to wait before allowing vehicles to cross the loop area.